

A REVISION OF THE AFRICAN GENUS *PHYLLOXIPHIA* ROTHSCHILD & JORDAN (LEPIDOPTERA : SPHINGIDAE)

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CONTENTS

	<i>Page</i>
SYNOPSIS	229
INTRODUCTION	229
ACKNOWLEDGEMENTS	230
LOCATION OF MATERIAL STUDIED	230
<i>Phylloxiphia</i> ROTHSCHILD & JORDAN	230
Key to the males	232
Descriptions of the species	233
REFERENCES	242
INDEX	243

SYNOPSIS

The genus *Phylloxiphia* Rothschild & Jordan is revised and an identification key to the species is given. Two generic and two specific synonyms are newly established. One species is recalled from synonymy.

INTRODUCTION

THE genus *Phylloxiphia* was erected by Rothschild & Jordan (1903) for the single new species *P. oberthueri* in their monumental revision of the Sphingidae. In the same work these authors placed *bicolor* Rothschild, known at that time only from the female holotype, in the Indo-Australian genus *Clanis* Hübner, and described a new species *karschi*, which they assigned to the genus *Pseudoclanis* Rothschild. They also mentioned *goodi* Holland, which they retained in *Polyptychus* Hübner although they had not examined the holotype. Since Rothschild and Jordan's work, many more specimens have been made available for study and over 200 have been examined during the preparation of the present paper.

The wing-measurements given in this paper were taken from the apex of the fore wing to the centre of the mesothorax. The bulk of the Carnegie Museum material has been identified from colour-transparencies taken by Mr A. Watson, deposited in the BMNH.

All the specimens figured are in the British Museum (Natural History) except the male of *Phylloxiphia karschi* Rothschild and Jordan, which is the property of the Mission Biologique au Gabon, and the holotype female of this species, together with the holotype male of *formosa*, which are deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin.

A key is given for the identification of male specimens. Until the female of *P. formosa* Schultze is known a complete key to the females cannot be compiled.

ACKNOWLEDGEMENTS

In addition to acknowledging the advice given to me by my colleagues at the British Museum (Natural History), I should like to thank Dr R. H. Carcasson for his encouragement with this project. I am grateful also to workers at the institutions listed below for their kind help. My thanks are due to members of the Photographic section of this museum who took the photographs reproduced in the plates. The Department is indebted to the following for their generous donations to the national collection: Dr G. Bernardi, Mr J. Boorman, Mr & Mrs A. Forbes-Watson, Dr B. J. MacNulty, Prof. D. F. Owen, Dr E. C. G. Pinhey, Mr J. N. Pollock and Mr F. H. F. Schofield.

LOCATION OF MATERIAL STUDIED

All specimens are in the British Museum (Natural History) (often abbreviated to BMNH) unless otherwise stated. Material was obtained on loan from the following institutions, through the courtesy of the workers mentioned; the abbreviations used where the material is listed in detail are given in parentheses. Museum für Naturkunde der Humboldt-Universität, Berlin, Dr H. J. Hannemann (MNHU); National Museum of Rhodesia, Bulawayo, Dr E. C. G. Pinhey (NMR); Universitets Zoologiske Museum, Copenhagen, Dr S. L. Tuxen (UZM); Zoologisches Sammlung des Bayerischen Staates, Munich, Dr F. Daniel (ZSBS); National Museum of Kenya, Nairobi, Mr M. Clifton (NMK); University Museum, Oxford, Mr E. Taylor (UM); Muséum National d'Histoire Naturelle, Paris, Dr P. C. Rougeot (MNHN); Mission Biologique au Gabon, Paris, Dr G. Bernardi (MBG); Carnegie Museum, Pittsburgh, Dr H. K. Clench (CM); Transvaal Museum, Pretoria, Dr L. Vári (TM); Musée Royal de l'Afrique Centrale, Tervuren, Dr L. A. Berger (MRAC).

PHYLLOXIPHIA Rothschild & Jordan

Phylloxiphia Rothschild & Jordan, 1903 : 263. Type-species: *Phylloxiphia oberthueri* Rothschild & Jordan, by original designation.

Libyoclanis Rothschild & Jordan, 1906a : 180. Type-species: *Libyoclanis bainbridgei* Rothschild & Jordan (= *Phylloxiphia goodi* (Holland)), by original designation. **Syn. n.**

Typhosia Rothschild & Jordan, 1906b : 406. Type-species: *Typhosia illustris* Rothschild & Jordan, by original designation.

Acentropoclanis Strand, 1915 : 132. Type-species: *Acentropoclanis bicolor* Rothschild sensu Strand, 1915 [misidentification of *Phylloxiphia vicina* (Rothschild & Jordan)], by original designation. **Syn. n.**

GENERIC SYNONYMY. Although Strand cited *Acentropoclanis bicolor* Rothschild as the type-species of *Acentropoclanis*, he did question his determination of the specimen before him. I have compared this specimen with the holotype of *bicolor* and find it to represent *P. vicina* Rothschild & Jordan. This is a case of a misidentified type-species, which under the International Code of Zoological Nomenclature, Article 70(a), should be referred to the Commission. Kernbach (1963b: 327-332) illustrates the close affinities of the genera *Libyoclanis* and *Typhosia* with *Phylloxiphia* and I consider all the species included in these genera to be congeneric.

DIAGNOSIS. Proboscis short, when extended not reaching beyond hind coxa. Palp short, not protruding beyond front of head. Legs spinose and with a single pair of short tibial spurs on fore and middle legs, two pairs on hind legs. Pulvillus present, paronychium bilobed. Fore wing elongate, brown in colour; hind wing brown, reddish brown or pink. Abdominal tergites with spines. Male genitalia with uncus terminating in two teeth, or more deeply bifid; valva elongate. Female genitalia with prominent horseshoe-shaped signum.

AFFINITIES. *Leptoclanis* has a cryptic pattern on the fore wing and a red hind wing similar to those found in the majority of *Phylloxiphia* species; however, the fore wing is green and the male genitalia lack the elongate valve found in *Phylloxiphia* (see *Leptoclanis pulchra* Rothschild & Jordan, genitalia figure, Carcasson, 1968: pl. 12, fig. 4).

Species in the Indo-Australian genus *Clanis* have genitalia similar to *Phylloxiphia* species (see Rothschild & Jordan, 1903: pl. 32, figs 7-11) but differ in the more complex harpe of the valve.

BIOLOGY. Little is known concerning the life-history of the species of this genus. The hind wing, which is brown in *oberthueri* but red or pink in other species, is concealed when the insects are at rest, and the cryptic pattern of the fore wing probably renders them inconspicuous on certain foliage. Dr B. J. MacNulty has reared *oweni* (Carcasson) at Port Harcourt, Nigeria (see Pl. 6, fig. 22). The food-plant is *Anthonotha macrophylla* P. Beauvois (Leguminosae), described and illustrated as *Macrolobium macrophyllum* in *Flore du Congo Belge*, 3: 422, t. 31 (1952). Descriptions of the larvae of this and other West African hawkmoths have been published recently (see MacNulty, 1970: 98). A female specimen of *oweni* from Eala, Congo (Kinshasa) in the Musée Royal de l'Afrique Centrale bears the data *Macrolobium palisoti* - Watsangila - this name is a synonym of *A. macrophylla*. Pinhey (1962: 40) states under his description of *punctum*:

"Duke says there are two forms of the full grown larva. The normal form is bluish-green above, (becoming bluer before pupation), tinted with yellow at the edges of this area; the sides dull green, faintly marked with oblique yellow stripes; a yellow mid-dorsal stripe. Surface of the body granular. Horn 'reddish, a quarter of an inch in length and slightly curved'. The other larval form is reddish pink above, 'pinkish fawn at the sides and the stripes are reddish'. Duke, in his notes sent to the Author, observes that this form appears in early autumn, when the leaves of the foodplant, *Ochna pulchra*, are turning orange-yellow, and he, therefore, concludes that it is an example of 'seasonal cryptic coloration'. He also thinks there may be three summer broods."

A pupal case of *metria* (Jordan) from Zambia (H. C. Dollman Collection) is figured (Pl. 5, fig. 21). This is the only preserved pupal case I have traced. The larva from which this specimen was reared is figured as *vicina* in the Dollman M.S. drawings deposited in the BMNH (see Pl. 6, fig. 23).

DISTRIBUTION. The maps on p. 241 (Text-fig. 2) show the distribution of each species opposite the vegetation map (Text-fig. 1) on p. 240.

SPECIES-GROUPS. *P. goodi*, *karschi* and *illustris* all exhibit a crenulate outer margin to the male fore wing. The process at the base of the valves is absent in the male genitalia of *goodi* and *karschi*, and the uncus terminates in two teeth; in both these species the females have an entire outer margin to the fore wing, which terminates in a falcate apex. In *oberthueri* the uncus is not so deeply bifid as in the remaining species, but the prominent band across the fore wing is shared with *illustris*. On the basis of these characters four-species groups are recognized, as shown in the following check-list.

goodi-group

P. goodi (Holland) **comb. n.**

Libyoclanis bainbridgei Rothschild & Jordan **syn. n.**

P. karschi (Rothschild & Jordan) **comb. n.**

illustris-group

P. illustris (Rothschild & Jordan) **comb. n.**

oberthueri-group

P. oberthueri Rothschild & Jordan

Libyoclanis hollandi Clark

vicina-group

P. bicolor (Rothschild) **comb. n.**

P. oweni (Carcasson) **comb. n.**

P. formosa Schultze **comb. rev.**

Libyoclanis major Rothschild & Jordan

P. vicina (Rothschild & Jordan) **comb. n.**

P. metria (Jordan) **comb. n.**

Libyoclanis noctivago Kernbach **syn. n.**

P. punctum (Rothschild) **comb. n.**

KEY TO THE MALES

- | | | |
|---|---|----------------------------|
| 1 | Outer margin of fore wing crenulate | 2 |
| - | Outer margin of fore wing entire | 4 |
| 2 | Dark band of fore wing extending from base of costa to end of cell, then curved towards apex (Pl. 2, fig. 5) (<i>illustris</i> -group) | <i>illustris</i> (p. 234) |
| - | No such band on fore wing (<i>goodi</i> -group) | 3 |
| 3 | Anal margin of hind wing cream, shading into prominent blackish brown band | <i>karschi</i> (p. 234) |
| - | Anal margin of hind wing buff | <i>goodi</i> (p. 233) |
| 4 | Fore wing with blackish brown pre-apical marking not extending to apex (Pls 4 & 5) (<i>vicina</i> -group in part) | 7 |
| - | Fore wing without blackish brown pre-apical marking | 5 |
| 5 | Fore wing with longitudinal dark band extending from base of costa to apex of wing (Pl. 2, fig. 7) (<i>oberthueri</i> -group) | <i>oberthueri</i> (p. 235) |
| - | Fore wing without longitudinal dark band (<i>vicina</i> -group in part) | 6 |
| 6 | Fore wing less than 47 mm. Genitalia with process at base of valve on large projection (Pl. 7, figs 32, 33) | <i>bicolor</i> (p. 235) |
| - | Fore wing more than 47 mm. Genitalia with process at base of valve on short projection (Pl. 8, figs 34, 35) | <i>oweni</i> (p. 236) |

7	Outer margin of fore wing concave towards apex (Pl. 4, figs 13-15)	. . . . .	8
-	Outer margin of fore wing not or hardly concave (Pl. 5, figs 17, 19)	. . . . .	9
8	Fore wing less than 46 mm. Genitalia with base of uncus not constricted (Pl. 9, figs 40, 41)	. . . . .	<i>victina</i> (p. 238)
-	Fore wing more than 46 mm. Genitalia with base of uncus constricted (Pl. 8, figs 36-39)	. . . . .	<i>formosa</i> (p. 237)
9	Fore wing irrorate with dark brown	. . . . .	<i>metria</i> (p. 239)
-	Fore wing not irrorate with dark brown	. . . . .	<i>punctum</i> (p. 240)

DESCRIPTIONS OF THE SPECIES

THE *GOODI*-GROUP

Male fore wing with crenulate outer margin. Female fore wing with entire outer margin terminating in blunt hook. No prominent band across fore wing from base of costa.

Phylloxiphia goodi (Holland) **comb. n.**

(Pl. I, figs 1, 2; Pl. 6, figs 24, 25; Pl. 10, fig. 46; Pl. 11, fig. 54)

Polyptychus goodi Holland, 1889 : 64, fig. Holotype ♂ (not ♀, as stated by Holland), GABON: Kangwé (CM, Pittsburgh) [colour-transparency examined].

Libyoclanis bainbridgei Rothschild & Jordan, 1906a : 180. Holotype ♀, SIERRA LEONE (BMNH) [examined]. **Syn. n.**

Libyoclanis karschi bainbridgei Rothschild & Jordan; Hering in Seitz, 1927 : 363.

Libyoclanis goodi (Holland) Darge, 1970 : 62 [♂ erroneously designated as neallotype].

♂. Fore wing with crenulate outer margin. Stigma of fore wing prominent. Genitalia with uncus terminating in two teeth; harpe well defined; no process at base of valve.

♀. Fore wing with entire outer margin terminating in blunt, falcate apex. Stigma prominent. Genitalia as in Pl. 10, fig. 46.

Wing-measurements. ♂ 47·8-53·7 mm; ♀ 64·9-70·4 mm.

Fore wing of both sexes without the prominent band extending across wing from base of costa, found in *illustris*. Hind wing of both sexes without blackish brown band found in *karschi*.

The BMNH possesses a colour-transparency of the holotype. The pectinations of the antennae show that it is a male and not a female as stated by Holland. This has been confirmed by Dr Clench, who has examined the frenulum, and the neallotype male described by Darge is therefore erroneously designated. Darge's specimen was previously mentioned and figured by Carcasson (1968 : 47), who also listed as a female a male from Irumu in the BMNH. Comparable sexual dimorphism in *karschi* provides sufficient evidence that the female holotype of *bainbridgei* is conspecific with the holotype of *goodi*.

MATERIAL EXAMINED.

Polyptychus goodi, holotype ♂, GABON: Kangwe (*A. C. Good*), CM; *Libyoclanis bainbridgei*, holotype ♀, SIERRA LEONE (Major *Bainbridge*).

LIBERIA: Grassfield, Nimba, 1 ♂, ix-x. 1968 (*A. Forbes-Watson*); CAMEROUN: Bitje River, 2,000 ft, 1 ♀, x-xi. 1918, wet season (Ex. Joicey); CONGO (KINSHASA): Uele, Paulis, 1 ♀, 31.V.1956 (*M. Fontaine*), MRAC; E. Ituri Valley, 30 miles south of Irumu, 3,000 ft, 1 ♂, vii. 1924 (*T. A. Barnes*).

***Phylloxiphia karschi* (Rothschild & Jordan) comb. n.**

(Pl. 1, figs 3, 4; Pl. 6, figs 26, 27)

Pseudoclanis karschi Rothschild & Jordan, 1903 : 220. Holotype ♀, CAMEROUN: Kriegschiffshafen (Victoria) (MNHU, Berlin) [examined].*Pseudoclanis karschi* Rothschild & Jordan; Clark, 1919 : 103. [Description of ♂.]

♂. Fore wing with crenulate outer margin. Hind margin of hind wing white shading into prominent blackish brown band. Genitalia with uncus terminating in two teeth; harpe poorly defined; no process at base of valve.

♀. Fore wing with prominently falcate apex; outer margin otherwise entire. Hind margin of hind wing white, shading into prominent blackish brown band. Genitalia probably deformed, therefore not figured.

Wing-measurements. ♂ 51.8 mm; ♀ 75.7 mm.

Neither *goodi* or *illustris* possess the blackish brown band on the hind wing. This species exhibits interesting sexual dimorphism in the shape of the fore wing.

MATERIAL EXAMINED.

Holotype ♀, CAMEROUN: Kriegschiffshafen (Victoria) (*v. Grabczewski T.*), MNHU.CAMEROUN: Lolodorf, 1 ♂, 2.ii.1915 (*A. I. Good*), CM; Lolodorf, 1 ♀, 4.v.1914 (*A. I. Good*), CM; GABON: Makokou-Colline, 1 ♂, 8.i.1968 (*G. Bernardi*), MBG.THE *ILLUSTRIS*-GROUP

Fore wing with crenulate outer margin in both sexes. Prominent band across fore wing from base of costa.

***Phylloxiphia illustris* (Rothschild & Jordan) comb. n.**

(Pl. 2, figs 5, 6; Pl. 7, figs 28, 29; Pl. 10, fig. 47; Pl. 11, fig. 55)

Typhosia illustris Rothschild & Jordan, 1906b: 407, LECTOTYPE ♂, GHANA (BMNH), here designated [examined].*Libyoclanis illustris* (Rothschild & Jordan) Carcasson, 1968 : 47.

♂. Fore wing with crenulate margin and with dark band extending from base of costa to beyond end of cell, curved towards apex. Genitalia with bifid uncus; characteristic process at base of costal margin of valve.

♀. Larger and broader winged but similar to male. Genitalia as in Pl. 10, fig. 47.

Wing-measurements. ♂ 32.0-37.5 mm; ♀ 40.3-41.6 mm.

Smaller than *goodi* and *karschi*, sexual dimorphism is less extreme.

MATERIAL EXAMINED.

LECTOTYPE ♂, GHANA (labelled 'Gold Coast 1905-47 *Typhosia illustris* Type. 1906. Novit. Zool.'), here designated. (In the original description Rothschild & Jordan (1906b : 407) give the data as 'Obuassi, Ashanti (G. E. Bergmann)'; it appears that they have repeated the data of the previously described species, *Polyptychus poliades* Rothschild & Jordan 1906b : 406.)GUINEA: Nimba, 1 ♂, vii-xii.1951 (*R. Lamotte*); SIERRA LEONE: Bo, 1 ♂, 8.iv.1959 (*R. Taylor*); IVORY COAST: Man, 1,200 ft, 1 ♂, 26-30.vi.1926 (*C. L. Collenette*); GHANA: 1 ♂ (Paralectotype); Juaso, Forest Country E. of Ashanti, 1 ♂ (*G. S. Cansdale*), 2 ♂ (*G. H. Gibbs*); Kwadaeo, 1 ♂, 18.vi.1955 (*Dept. Agric.*); NIGERIA: Sobo Plain, nr Sapele, 1 ♀, 5.iii.1957 (*B. J. MacNulty*); CAMEROUN: Efulan, 2 ♂ (*H. L.*

Weber); GABON: Belinga, 700 m, Camp Central, 1 ♂, 14.v.1963 (*G. Bernardi*), BMNH, 1 ♂, 24.xi.1967 (*G. Bernardi*), MBG; Ipassa, 1 ♂, 27.x.1967 (*G. Bernardi*), MBG; Makokou-Colline, 1 ♂, 5-7.xi.1967 (*G. Bernardi*), MBG, 1 ♀, 16.i.1968 (*G. Bernardi*), MBG; CONGO (KINSHASA): Bafwasende, Lindi River, 2,000 ft, 1 ♂, vi.1921 (*T. A. Barnes*).

THE *OBERTHUERI*-GROUP

Fore wing with entire outer margin. Prominent band across fore wing from base of costa.

Phylloxiphia oberthueri Rothschild & Jordan

(Pl. 2, figs 7, 8; Pl. 7, figs 30, 31; Pl. 10, fig. 48; Pl. 11, fig. 56)

Phylloxiphia oberthueri Rothschild & Jordan, 1903 : 263, fig. Holotype ♂, CAMEROUN: Lolodorf (*L. Conradt*) ex Oberthuer Collection (CM, Pittsburgh).

Libyoclanis hollandi Clark, 1917 : 62, fig.

♂. Fore wing with entire, concave outer margin, and with a dark band extending from base of costa to beyond end of cell, curved towards apex of wing. Hind wing brown. Genitalia with bifid uncus; characteristic process at base of valve.

♀. Larger and broader-winged, but similar to male. Genitalia as in Pl. 10, fig. 48.

Wing-measurements. ♂ 46.5-48.6 mm; ♀ 58.3 mm.

This is the only known species with a dark brown hind wing.

MATERIAL EXAMINED.

LIBERIA: Grassfield, Nimba, 1 ♂, ii.1968, 1 ♂, ii.1968, 1 ♂, vii.1967, 2 ♂, vii-viii.1967 (*A. Forbes-Watson*); Gissi, 1 ♀, 20.iv.1909 (*A. Pearse*); CAMEROUN: Efulan, 2 ♂; GABON: Ipassa, 1 ♂, 6.xi.1967 (*G. Bernardi*).

THE *VICINA*-GROUP

Fore wing with entire outer margin. No prominent band across fore wing from base of costa.

Phylloxiphia bicolor (Rothschild) **comb. n.**

(Pl. 3, figs 9, 10; Pl. 7, figs 32, 33; Pl. 10, fig. 49; Pl. 11, fig. 57)

Clanis bicolor Rothschild, 1894 : 96 Holotype ♀, without data (BMNH) [examined].

[*Libyoclanis vicina* Rothschild & Jordan; Kernbach 1957 : 179. Misidentification.]

♂. Fore wing with entire, concave outer margin; pre-apical blackish brown marking absent. Genitalia with bifid uncus; characteristic process at base of valve.

♀. Larger and broader winged, but similar to male. Genitalia as in Pl. 10, fig. 49.

Wing-measurements. ♂ 35.5-44.0 mm; ♀ 43.8-47.0 mm.

Separated from *oweni* by its smaller size and the more strongly arcuate, proximal fascia on the ventral surface of the hind wing. Genitalic differences also separate this species from *oweni*.

MATERIAL EXAMINED.

Holotype ♀. This specimen is without data but closely matches West African females.

SIERRA LEONE: 1 ♀, ex Rothschild Collection; Freetown, 1 ♂, ix.1949 (*W. Peters*), 3 ♂, xii.1968 (*D. F. Owen*); Bo, 1 ♂, v.1967 (*J. N. Pollock*), 1 ♀, vi.1967 (*J. N. Pollock*); Murray Town, 1 ♂, 1911 (*C. A. Foster*), UM; LIBERIA: Grassfield, Nimba, 2 ♂, vii.1967 (*A. Forbes-Watson*), 1 ♂, viii-xi.1967 (*A. Forbes-Watson*), NMR; Marshall Terr., Harbel, 1 ♂, 8.v.1956 (*R. M. Fox*), CM; IVORY COAST: Azaguie, 1 ♂, vi.1964 (*Guerout*), MRAC, 1 ♂, vii.1964 (*Guerout*), MRAC, 2 ♂, viii.1964 (*Guerout*), MRAC, 1 ♂, ix.1964 (*Abdoulaye*), MRAC; Anguededou, 1 ♂, vii.1964 (*Guerout*), MRAC; Adiopodoumé, 1 ♂, ix.1963 (*P. Griveaud*), MNHN, 1 ♂, xi.1963 (*P. Griveaud*), MRAC; Barr. d'Aydmé, 1 ♂, i.1964 (*Piart & Griveaud*), MNHN; Bingerville, 1 ♂ (*R. Pujol*), MNHN; Lamto, 1 ♂, ii.1964 (*P. Griveaud*), MNHN; Divo, 1 ♂ (*R. Pujol*), MNHN, 1 ♂, 5.x.1962 (*R. Pujol*), MNHN, 2 ♂, 18.x.1962 (*R. Pujol*), MNHN; GHANA: Sekondi, 1 ♂; Adjahbippo, 46 miles inland from Sekondi, 1 ♂; Presten, 75 miles inland from Sekondi, 1 ♂, CM; Wassaw district, 45 miles inland from Sekondi, 1 ♂; Between coast and Kumasi, 1 ♂ (*C. H. McDowall*); Abossi, 1 ♂ (*J. L. Wilson*); Bibianaha, 700 ft, 1 ♂, 25.iv.1912 (*H. G. F. Spurrell*); NIGERIA: Lagos, 1 ♂ (*J. Boorman*), 1 ♂, vi.1957 (*J. Boorman*), 1 ♀, viii.1958 (*J. Boorman*); Ibadan, 1 ♂, viii-ix.1955 (*B. N. Alexander*), 3 ♂, ca i-vi.1954 (*H. Stenholt Clausen*). UZM; CAMEROUN: 1 ♂, ZSBS; Jaunde, 1 ♂, (*P. Ringler*), CM; GABON: Belinga, 700 m, Camp Central, 1 ♂, 15.iii.1963 (*G. Bernardi*), MBG, 1 ♂, 24.iii.1962 (*G. Bernardi*), 1 ♂, 25.iii.1962 (*G. Bernardi*), MBG, 1 ♂, 30.v.1963 (*G. Bernardi*), MBG; Belinga, 900 m, Grande Crête Sud, 1 ♂, 16.iii.1963 (*G. Bernardi*), MBG, 1 ♂, 29.iii.1963 (*G. Bernardi*), MBG, 1 ♂, 18.iv.1963 (*G. Bernardi*), MBG; Ipassa, 1 ♂, 6.xi.1967 (*G. Bernardi*), MBG, 1 ♂, 9.xi.1967 (*G. Bernardi*), MBG, 1 ♂, 27.xi.1967 (*G. Bernardi*), MBG, 1 ♂, 6.xii.1967 (*G. Bernardi*); Makokou Colline, 1 ♂, 7.iii.1962 (*G. Bernardi*), MBG, 1 ♂, 13.iii.1962 (*G. Bernardi*), MBG, 2 ♂, 13.xii.1967 (*G. Bernardi*), MBG, Savanes Mwadi, 1 ♂, 1.iv.1963 (*G. Bernardi*). MBG; plage face Mwadi, 1 ♂, 13.iii.1963 (*G. Bernardi*), MBG; Lastourville, 2 ♂, (*P. Rougeot*), MNHN; CENTRAL AFRICAN REPUBLIC: Boukoko, 1 ♀ (*R. Pujol*), MNHN; La Maboke, 1 ♂, 17.xii.1965 (*R. Pujol*), MRAC; CONGO (KINSHASA): Mbila (Mts du Chaillu), 1 ♂, xii.1963 (*A. Descarpentries & A. Villiers*), MNHN; Dimonika (*Mayumbe*) 1 ♂, i.1964 (*A. Descarpentries & A. Villiers*), MNHN; Kasai, Luluabourg, 1 ♂, 17.vi.1953 (*M. Fontaine*), MRAC; Sankuru, Lusambo, 1 ♂, 22.vii.1950 (*M. Fontaine*), MRAC, 1 ♀, 2.viii.1950 (*M. Fontaine*), MRAC; Uele, Paulis, 1 ♂, 7.iv.1956 (*M. Fontaine*), MRAC, 1 ♂, 11.vi.1958 (*M. Fontaine*), MRAC; ANGOLA: Dundo, 1 ♂, 28.x.1962 (*D. B. M.*), MNHN.

***Phylloxiphia oweni* (Carcasson) comb. n.**

(Pl. 3, figs 11, 12; Pl. 6, fig. 22; Pl. 8, figs 34, 35; Pl. 10, fig. 50; Pl. 11, fig. 58)

[*Clanis bicolor* Rothschild; Rothschild & Jordan, 1903 : 219. Misidentification of ♀ from Sierra Leone.]

[*Libyoclanis major* Rothschild & Jordan, 1915 : 284. Misidentification of ♀ from Sierra Leone.]

[*Libyoclanis bicolor* Rothschild; Kernbach, 1957 : 179. Misidentification.]

[*Libyoclanis major* Rothschild & Jordan; Boorman, 1960 : 162, fig. Misidentification.]

Libyoclanis oweni Carcasson, 1968 : 45. Holotype ♂, SIERRA LEONE: Freetown (BMNH) [examined].

♂. Fore wing with entire, concave outer margin; pre-apical blackish brown marking absent.

Genitalia with bifid uncus, constricted at base; characteristic process at base of valve.

♀. Larger and broader winged than male. Genitalia as in Pl. 10, fig. 50.

Wing-measurements. ♂ 50.5–57.0 mm; ♀ 53.3–66.8 mm.

Larger than *bicolor*, it can be separated by the less strongly arcuate proximal fascia on the ventral surface of the hind wing. Genitalic differences also separate this species from *bicolor*.

MATERIAL EXAMINED.

Holotype ♂, SIERRA LEONE: Freetown, vi.1967 (*D. F. Owen*).

SIERRA LEONE: 1 ♀ (ex Rothschild Coll.), BMNH; 1 ♀, CM; Freetown, 2 ♂, iii.1969 (*D. F. Owen*), 1 ♂, xii.1968 (*D. F. Owen*), 1 ♀, 1966 (*D. F. Owen*); Bo, 1 ♂, 29.iv.1967 (*J. N. Pollock*), 2 ♂, v.1967 (*J. N. Pollock*), 1 ♂, vi.1967 (*J. N. Pollock*); LIBERIA: Harbel, Marshall Terr., 1 ♂, 9.x.1955, 1 ♂, II.xii.1955, 1 ♂, 7.vi.1956, 1 ♂, 7.vi.1955, 1 ♂, I.ii.1957 (all *R. M. Fox*), all CM; IVORY COAST: Adiopo, 1 ♂, iv.1964 (*P. Griveaud*), MBG; Mokta, 1 ♂, 5–14.vi.1964 (*P. Griveaud*), NMR; NIGERIA: Port Harcourt, 1 ♂, 22.xii.1957 (*B. J. MacNulty*), 1 ♂, 19.i.1958 (*B. J. MacNulty*), 1 ♂, bred – foodplant *Macrolobium macrophyllum* McBride (see larval photograph, Pl. 6, fig. 22), 3.ii.1958 (*B. J. MacNulty*); Omo, 1 ♂, vii.1960 (*J. Boorman*); Lagos, 1 ♀, v.1955 (*J. Boorman*); CAMEROUN: Bipindi, 1 ♀, MNHU; CONGO (KINSHASA): Eala, 1 ♀, bred – foodplant *Macrolobium palisoti* Watsanjila (see notes under Biology, p. 231), 3.iii.1938 (*J. Couteaux*), MRAC; Kasai, Luluabourg, 1 ♂, II.v.1953 (*M. Fontaine*), MRAC; Uele, Bambesa, 1 ♂, vi.1938 (*J. Vrydagh*), MRAC; Katanga, Kapanga, 1 ♂, ii.1935 (Coll. le Moul't), CM.

Phylloxiphia formosa Schultze comb. rev.

(Pl. 4, fig. 13; Pl. 8, figs 36–39)

Phylloxiphia formosa Schultze, 1914 : 125. Holotype ♂, CAMEROUN: Crossflussgebiet (MNHU, Berlin) [Examined].

Libyoclanis major Rothschild & Jordan, 1915 : 284. Holotype ♂, SIERRA LEONE (UM, Oxford) [examined].

[*Libyoclanis bicolor* Rothschild; Carcasson, 1968 : 45. Misidentification.]

♂. Fore wing with entire, concave outer margin and pre-apical blackish brown marking. Genitalia with bifid uncus constricted at base and ridged dorsally; characteristic process at base of costal margin of valve.

♀. The female is not known.

Wing-measurements. ♂ 46.5–61.5 mm; ♀ not known.

The male of this species can be separated from *P. vicina* Rothschild & Jordan by its larger size and on the ventral surface of the fore wing by the pale distal edge to the subterminal fascia. On the ventral surface of the hind wing the lunulate, distal fascia and the dense, red suffusion along the hind margin distinguish this species. Rarely one of these characters may be present in the smaller *vicina*, but in no example so far examined have two or more of these characters been noted. Structurally the dorsal surface of the uncus in *formosa* is ridged whilst that of *vicina* is smooth. The uncus is constricted at the base in *formosa*.

MATERIAL EXAMINED.

Phylloxiphia formosa, holotype ♂, CAMEROUN: N. W. Kamerun, Crossflussgebiet,

cl. 29.vi.1906 (*Arnold Schultze*), MNHU. *Libyoclanis major*, holotype ♂, SIERRA LEONE, UM.

LIBERIA: Grassfield, Nimba, 1 ♂, vii-viii. 1967, 1 ♂, viii-ix.1967 (both *A. Forbes-Watson*); IVORY COAST: Barr. d'Aydmé, 1 ♂, i.1964 (*Piart & Griveaud*), MBG; GABON: Belinga, 700 m, Camp Central, 1 ♂, 19.v.1963 (*G. Bernardi*), MBG; Makokou-Colline, 1 ♂, 1-3.xi.1967 (*G. Bernardi*), MBG; CONGO (KINSHASA): Kibali - Ituri, Nia-Nia, 1 ♂, 20.ix.1955 (*M. Fontaine*), MRAC; UGANDA: Malabigambo Forest, Sango Bay, 5 ♂, ii.1968 (*A. L. Archer*), NMK, 2 ♂, same data BMNH; ZAMBIA: Musondo Falls, nr. Mansa, Fort Roseberry, 1 ♂, 7.xii.1969 (*F. H. F. Schofield*).

Phylloxiphia vicina (Rothschild & Jordan) **comb. n.**

(Pl. 4, figs 14-16; Pl. 9, figs 40, 41; Pl. 10, fig. 51; Pl. 11, fig. 59)

Libyoclanis vicina Rothschild & Jordan, 1915 : 285. Holotype ♂, NIGERIA: Cross River [examined].

[*Acentropoclanis bicolor* Rothschild; Strand, 1915 : 132. Misidentification.]

[*Libyoclanis punctum* Rothschild; Kernbach, 1957 : 176. Misidentification.]

[*Libyoclanis metria* Jordan; Kernbach, 1963a : 168 and 1963b : 330. Misidentifications.]

[*Libyoclanis punctum* Rothschild; Carcasson, 1968: Pl. 3, fig. 7. Misidentification.]

♂. Fore wing with entire, concave outer margin and pre-apical blackish brown marking. Genitalia with smooth dorsal surface to bifid uncus; no constriction at base of uncus. Some variation is evident in the medial plate of the gnathus which in the holotype is two-thirds as broad as that in specimens from Ruwe, Katanga, Congo (Kinshasa); Mt. Tonkoui, Ivory Coast; Umtali, Rhodesia; (ratio 24 : 38); in a specimen from Liberia the medial plate is intermediate in width, ratio 24 : 29. Characteristic process present at base of costal margin of valve.

♀. Larger and broader-winged but similar to male. Genitalia as in Pl. 10, fig. 51.

Wing-measurements. ♂ 33.0-45.5 mm; ♀ 36.9-52.2 mm.

This species is smaller than *formosa* and can be separated by other characters mentioned previously under *formosa*.

MATERIAL EXAMINED.

Holotype ♂, NIGERIA: Cross River (*F. G. Martell*).

LIBERIA: Harbel, Marshall Terr., 20 ♂, 22.iii., 4-27.v., 19-30.vi., 21.vii. and 7.xii.1955, 9.iii., 9.ix., and 7-13.vi.1956, 1.ii., 25.iii. and 7-25.iv.1957 (all *R. M. Fox*), all CM; IVORY COAST: Adiopodoumé, 1 ♂, iv.1964 (*P. Griveaud*), MNHN; Mt. Tonkoui, 1,150 m, 1 ♂, 9-14.iii.1964 (*Piart & Griveaud*), MNHN; NIGERIA: Opobo, Sud-Nigerien, 1 ♂ (*G. Schultze*), MNHU (Strand's specimen, misidentified as *bicolor*, upon which *Acentropoclanis* was based); CENTRAL AFRICAN REPUBLIC: Boukoko, 1 ♀ (*R. Pujol*), MNHN; GABON: Mt. Bengué, 1 ♂, 6.x.1961 (*G. Bernardi*), MBG; Belinga, 700 m, Camp Central, 1 ♂, 2.vi.1963 (*G. Bernardi*); CONGO (BRAZZAVILLE): Congo Francais, 1 ♀ (*Le Moullet*), CM; CONGO (KINSHASA): Luluabourg, 1 ♀ (ex Rothschild); Sankuru, Katoko Kombe, 1 ♂, 2.i.1952 (*M. Fontaine*) MRAC; Katanga, Ruwe, 2 ♂, ii.1957 (*V. Allard*) MNHN; Katanga, Kolwezi, Lualaba, 1 ♂, 6.iii.1961, MNHN; Elisabethville, 1 ♂, 3 ♀, 29.ii. - 8.iv.1936 (*Seydel*), CM; 4 ♂, 1 ♀, 1.ii.1936, 23.xi.1936, 14.iii.1950, 1.i.1952, 10.ii.1952 (*Seydel*), MRAC; Katanga, Zilo, 1 ♂, 1.iv.1968 (*V. Allard*), NMR; Katanga, 1 ♂, xii.1965, NMK; without further data, 1 ♂, 8.iv.1936 (*Seydel*), MNHU; 1 ♀, 21.iv.1936 (*Seydel*) MNHU; TANZANIA: Songea, S. Province, 1 ♂, iv.1962 (*C. H. McCleery*), NMK; Kigonsera, 1 ♀, ZSBS; ZAMBIA:

Chalimbana, 2 ♂, 22.ix.1966, 11.x.1966 (*F. H. F. Schofield*); Chisamba F. R., nr Lusaka, bred ♀, 20.xii.1968 (*F. H. F. Schofield*); Solwezi, 1 ♂, 28.xi.1917 (*H. C. Dollman*); RHODESIA: Umtali, 1 ♂, ii.1963 (*C. Morris*); Salisbury, 1 ♀ (*Stevenson*), NMR, 1 ♀, 15.ii.1925 (*J. A. O'Neil*), CM; Victoria Falls, 1 ♂, xii.1917, CM; Vumba, 5 ♂, 25.xi.1955 (*B. D. Barnes*), TM; 10.i.1956 (*B. D. Barnes*), NMR; 4.xii.1956 (*B. D. Barnes*), TM; 15.ii.1959 (*B. D. Barnes*), NMR; 2.iii.1967 (*B. D. Barnes*), NMR; Laurenceville, Vumba, 10 ♂, 11.i.1952 (*H. Cookson*), TM; 27.ix.1957 (*H. Cookson*), TM; 20.xi.1957 (*H. Cookson*), NMR; 25.ii.1958 (*H. Cookson*), TM; 11.i.1959 (*H. Cookson*), NMR; 11.i.1962 (*H. Cookson*), TM; 27.i.1962 (*H. Cookson*), NMK; 16.ii.1962 (*H. Cookson*), TM; 28.ii.1962 (*H. Cookson*), NMR; 23.ii.1963 (*H. Cookson*), TMP; 12.x.1963 (*D. M. Cookson*), TM; 25.iii.1963 (*D. M. Cookson*), 3.x.1964 (*D. M. Cookson*), NMR; 1 ♀, 30.i.1959 (*H. Cookson*), NMR.

***Phylloxiphia metria* (Jordan) comb. n.**

(Pl. 5, figs 19–21; Pl. 6, fig. 23; Pl. 9, figs 42, 43; Pl. 10, fig. 52; Pl. 11, fig. 60)

Libyoclanis metria Jordan, 1920 : 167. Holotype ♂, RHODESIA: Emangeni, 18.i.1918 (*A. J. T. Janse*) (TM, Pretoria).

Libyoclanis noctivago Kernbach, 1957 : 176. Holotype ♂, CONGO (KINSHASA): Elisabethville (MRAC, Tervuren) [examined]. **Syn. n.**

♂. Fore wing with entire, convex outer margin and pre-apical blackish brown marking; irrorate with dark brown. Genitalia with bifid uncus; characteristic process on costal margin at base of valve.

♀. Larger and broader-winged than male. Genitalia as in Pl. 10, fig. 52.

Wing-measurements. ♂ 35.8–44.0 mm; ♀ 43.6–51.8 mm.

Larger than *punctum*, the fore wing maculation distinguishes this species.

I have not examined the holotype, which is in poor condition, but Dr Vári has kindly sent me specimens compared with the holotype. The synonymy of *noctivago* with *metria* was anticipated by Carcasson (1968 : 46).

MATERIAL EXAMINED.

Libyoclanis noctivago, holotype ♂, CONGO (KINSHASA): Elisabethville, ii.1952 (*Seydel*), MRAC.

CONGO (KINSHASA): Elisabethville, 1 ♂, 1.ii.1952 (*Seydel*), MRAC; TANZANIA: Ilonga, 1 ♂, v.1966 (*I. Robertson*); ZAMBIA: Chalimbana, 1 ♂, 3.x.1966 (*F. H. F. Schofield*), 1 ♂, 4.i.1967 (*F. H. F. Schofield*), 1 ♂, 28.xi.1968 (*F. H. F. Schofield*); Mwenga, 75 miles West of N'dola, 1 ♂, 25.ix.1914 (*H. C. Dollman*), 1 ♀ with pupal case, 10.x.1914 (*H. C. Dollman*); Abercorn, 1 ♀, v.1964 (*D. Vesey Fitzgerald*), NMK; Livingstone, 1 ♂, 4.iii.1942 (*W. Eichler*), TM, 1 ♂, 15.iii.1942 (*W. Eichler*, TM; MALAWI: Mt. Mlanje, 1 ♂, 19.iii.1913 (*S. A. Neave*); Nkula Falls, 1,200 ft., 4.xi.1965 (*J.O.H.*), NMR; MOZAMBIQUE: Dondo, 1 ♂, 8.iv.1961 (*D. M. Cookson*), NMR; Amatongas, 1 ♂, 7.i.1962 (*D. M. Cookson*), NMR; RHODESIA: Bazely Br., 1 ♂, 28.i.1963 (*D. M. Cookson*), NMR, 2 ♂, 13.xii.1963 (*D. M. Cookson*), TMP; Victoria Falls, 1 ♀, xii.1917, TM; Vumba, 1 ♂, 25.xii.1962 (*B. D. Barnes*), NMR; Laurenceville, 1 ♂, 31.i.1963 (*H. Cookson*), NMR; Penkrige, Melsetter Distr., bred from pupa, 1 ♀, 10.xi.1928 (*R. H. R. Stevenson*), NMR; Khami, 1 ♂, 24.xii.1954, MNHN, 1 ♂, x.1955; Marandellas, 1 ♂, ii.1961, NMR;

Gwelo Airport, 1 ♂, 22.iv.1969 (*P. Pile*), NMR; Nyanyadzi, 1 ♂, 30.ix.1962 (*D. M. Cookson*), NMR; Bindura, 1 ♂, 15.i.1938 (*E. W. Lannin*), NMR; Telukwe, 1 ♂, 25.x.1941 (*R. H. R. Stevenson*), NMR.

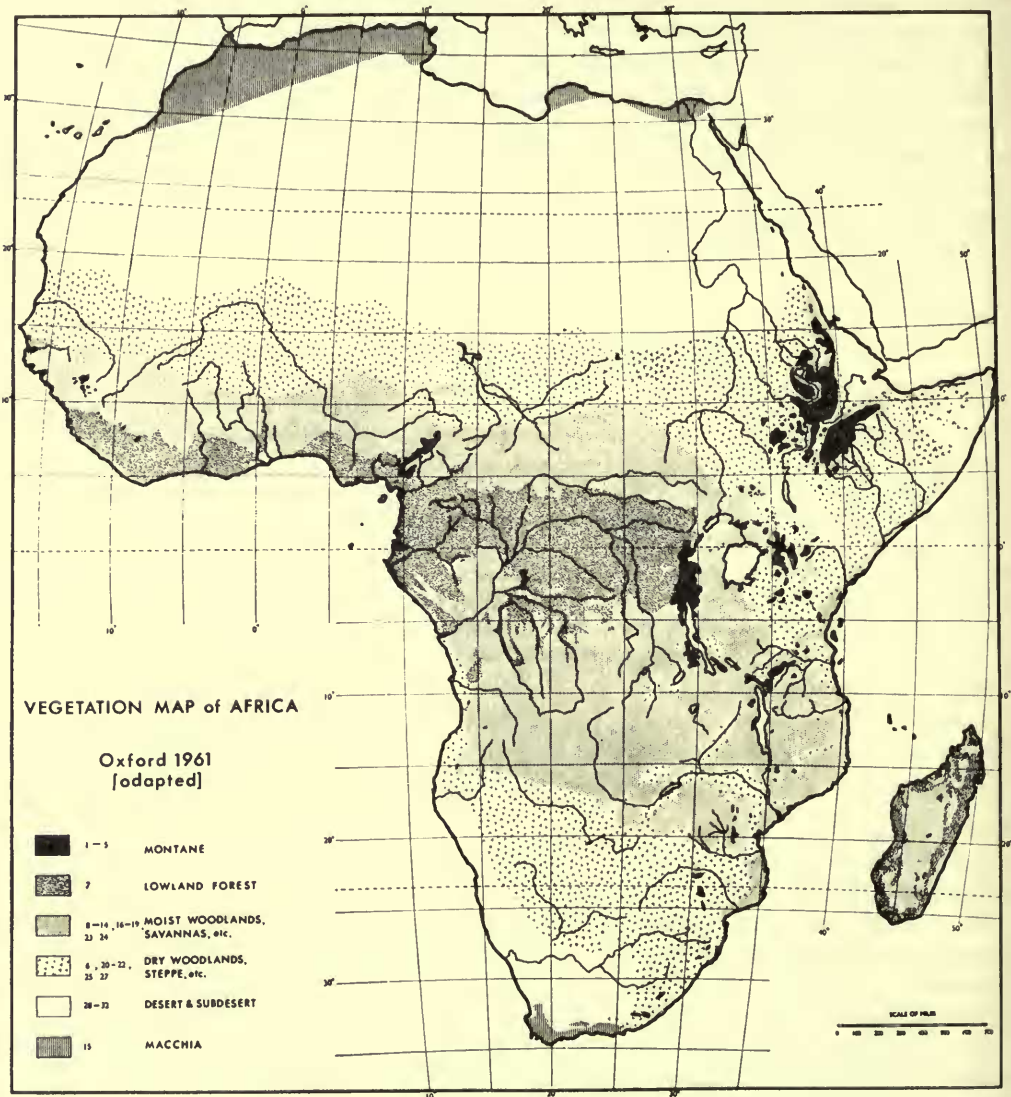


FIG. 1. Vegetation Map of Africa.

Phylloxiphia punctum (Rothschild) **comb. n.**

(Pl. 5, figs 17, 18; Pl. 9, figs 44, 45; Pl. 10, fig. 53; Pl. 11, fig. 61)

Libyoclanis punctum Rothschild 1907 : 507. Holotype ♂, RHODESIA: Salisbury (BMNH) [examined].

♂. Fore wing entire, with convex outer margin and pre-apical blackish brown marking;

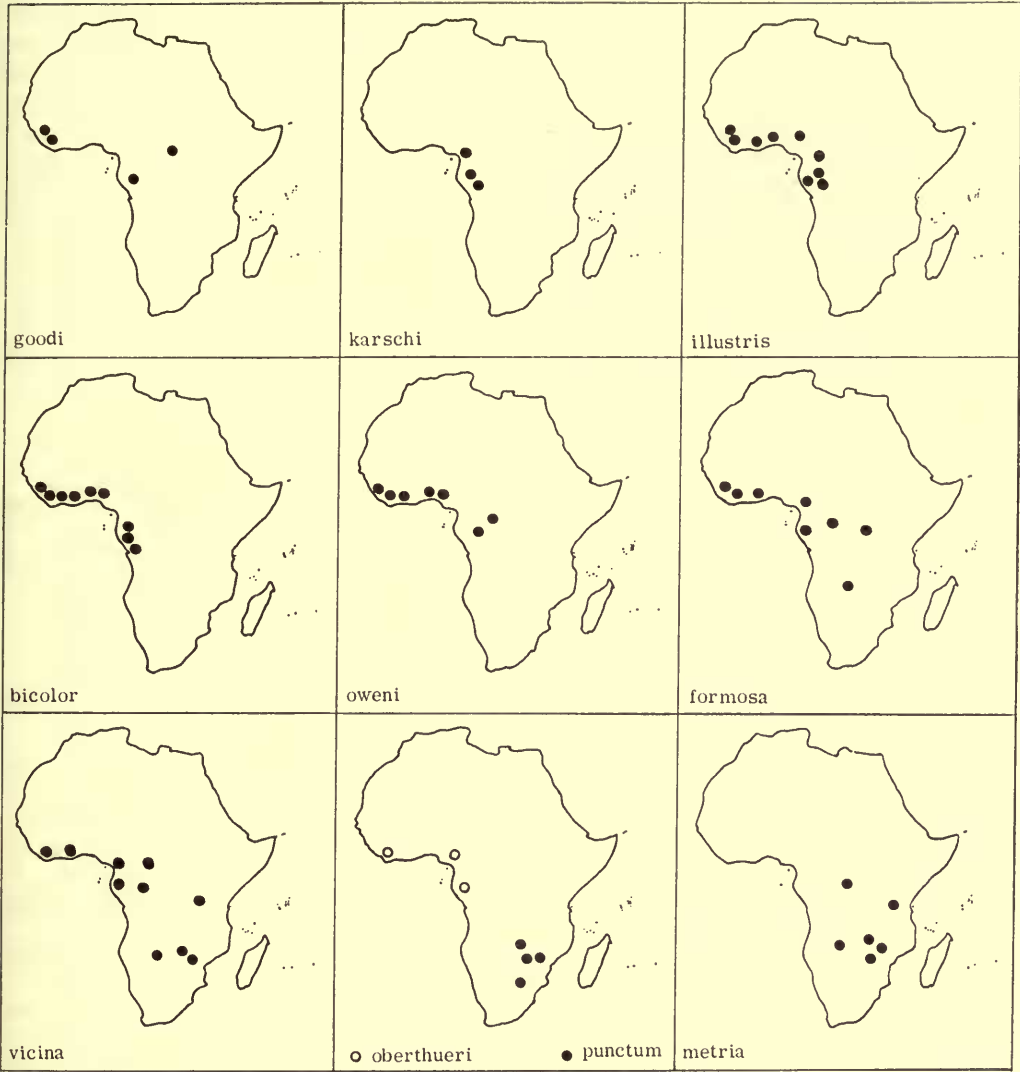


FIG. 2. Distribution Maps of *Phylloxiphia* species.

maculation absent. Genitalia with bifid, rounded uncus; very characteristic complex process at base of valve.

♀. Larger and broader-winged than male. Genitalia as in Pl. 10, fig. 53.

Wing-measurements. ♂ 29.5-37.7 mm; ♀ 31.3-41.8 mm.

Smaller than *metria* and devoid of fore wing maculation. The genitalia also separate this species from *metria*.

MATERIAL EXAMINED.

Holotype ♂, RHODESIA: Salisbury, iii.1904 (G. A. K. Marshall).

RHODESIA: Salisbury, 1 ♀ reared on *Ochna* sp., 8.xii.1959 (A. J. Duke), 1 ♀ reared

9.v.1960 (*A. J. Duke*), NMR; Sawmills, 1 ♂, 10.ii.1923 (*Swinburne & Stevenson*), CM; Wankie, 1 ♀, xi.1961, NMR; Devuli, 1 ♂, 12.xi.1965, NMR; Khami, nr Bulawayo, 1 ♂, xi.1955, NMR; Nyamandlovu, 1 ♂, 23.xi.1963, NMR; SOUTH AFRICA: Johannesburg, 1 ♂, CM; Pretoria, 1 ♂, 1.ix.1915 (*A. J. T. Janse*), 1 ♂, xi.1946 (*G. van Son*), NMR, 1 ♂, 19.x.1915 (*A. J. T. Janse*), TM, 1 ♀, iii.1909 (*A. J. T. Janse*), TM, 1 ♂, ix.1946 (*G. van Son*), TM, 1 ♀, 30.x.1947 (*G. van Son*), TM, 2 ♀, 23.ix.1918, TM, 1 ♂, 11.xii.1911 (*Lord Gladstone*), TM, 1 ♂, xi.1946 (*G. van Son*), TM, 1 ♂, 16.x.1939 (*G. van Son*), TM.

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INDEX

(Invalid names in italics)

- Acentropoclanis* Strand, 230
bainbridgei Rothschild & Jordan, 233
bicolor Rothschild, 235
Clanis Hübner, 231
formosa Schultze, 237
goodi Holland, 233
hollandi Clark, 235
illustris Rothschild & Jordan, 234
karschi Rothschild & Jordan, 234
Leptoclanis Rothschild & Jordan, 231
- Libyoclanis* Rothschild & Jordan, 230
major Rothschild & Jordan, 237
metria Jordan, 239
noctivago Kernbach, 239
oberthueri Rothschild & Jordan, 235
oweni Carcasson, 236
Phylloxiphia Rothschild & Jordan, 230
punctum Rothschild, 240
Typhosia Rothschild & Jordan, 230
vicina Rothschild & Jordan, 238